

Appendix D

Part 1



DECLARATION FOR THE BENNETT'S DUMP RECORD OF DECISION AMENDMENT

SITE NAME AND LOCATION

The Bennett's Dump site, sometimes referred to as the Bennett's Stone Quarry is located in Bloomington, Indiana. The National Superfund Database identification number is IND006418651. This Record of Decision Amendment addresses contaminated water and sediment and is referred to as operable unit 2 and operable unit 3.

STATEMENT AND BASIS AND PURPOSE

This decision document presents the Selected Remedy for the Bennett's Dump site, located in Bloomington, Indiana. This ROD Amendment presents the remedial action selected in accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and Section 300.435(c)(2)(ii) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This ROD Amendment will become part of the Administrative Record file per Section 300.825(a)(2) of the NCP. The Administrative Record, which contains the information on which selection of the remedial action was based, is available for review at the Monroe County Public Library in Bloomington, Indiana, as well as at the U.S. Environmental Protection Agency, Region 5 Superfund Records Center.

ASSESSMENT OF SITE

The response action selected in the Record of Decision Amendment is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Selected Remedy for the Bennett's Dump site addresses groundwater and sediment contaminated by PCBs from springs located on the site. The source control operable unit one was completed in 1999 and addressed the principal threat waste through the excavation and off-site disposal and off-site incineration of high concentrations of PCB waste, including PCB oil-filled capacitors. Sampling of sediment has shown that no additional sediment cleanup is required since PCB levels are below 1 part per million and it is unlikely that further risk reduction will occur in light of the low level of sediment contamination in Stout's Creek. The Selected Remedy for the site consists of the installation of a passive quarry drain to reduce groundwater flow and the construction of groundwater interceptor trench with carbon adsorption treatment for the PCB contaminated groundwater. The major components of the water operable unit consist of the following:

- Install a passive quarry drain system to reduce the flow from springs and groundwater. The passive quarry drain will drain the Wedge Quarry Complex to reduce the groundwater elevation and thereby reduce groundwater flow from the springs. Icebox Quarry may also

be drained into the Wedge Quarry Complex. Treatment of water from Icebox Quarry may be required since sampling has shown PCBs at 0.1 ppb PCBs.

- Install a groundwater interceptor trench to capture groundwater and treat the PCB contaminated water prior to discharge to Stout's Creek. The discharge will meet the National Pollution Discharge Elimination System (NPDES) substantive requirements. The conceptual design of the interceptor trench would be to locate the trench along the east side of Stout's Creek and be approximately 800-feet long and 8 feet deep. The trench would collect all discharges from the springs at the site, as well as collect contaminated groundwater that may be emerging from springs in and along Stout's Creek. Groundwater is assumed to flow at a maximum of 100 gallons per minute during storm events. A pre-design study on the groundwater will be required after the installation of the passive quarry drain to determine the final design parameters of the interceptor trench and treatment system.
- An Operations and Maintenance Plan will be developed for the collection and treatment system and a monitoring program to monitor the effectiveness of the remedy.
- Deed restrictions will be required to prevent residential development, deep excavation in the former quarry pits and placement of drinking water wells on the site. Fencing around the interceptor trench and treatment system will also be required.

STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e. reduces the toxicity, mobility, or volume of hazardous substances, pollutants, or contaminants as a principal element through treatment). Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment. The first Five-Year Review was completed in August 2002 and next scheduled review is in August 2007.

RECORD OF DECISION AMENDMENT DATA CERTIFICATION CHECKLIST

The following information is included in the Decision summary section of the Record of Decision amendment. Additional information can be found in the Administrative Record located at the Monroe County Public Library.

- Chemicals of concern and their respective concentrations are located on Page 6.
- Baseline risks represented by the chemicals of concern are located on Pages 11 - 14.
- Cleanup levels established for chemicals of concern and the basis for these levels are located on Page 28.

- Description of how source materials constituting principal threats are addressed is addressed on Page 27.
- Description of the current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD Amendment are located on Page 8.
- Description of the potential land and groundwater use that will be available at the site as a result of the implementation of the passive quarry drain and groundwater interceptor trench with treatment is located on Page 8 .
- Description of the estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected is located in Tables 1 and 2.
- Description of the key factors that led to selecting the remedy is located on Pages 22 - 25.

AUTHORIZING SIGNATURES AND SUPPORT AGENCY ACCEPTANCE OF REMEDY

The United States Environmental Protection Agency is the lead Agency for developing and preparing this Record of Decision Amendment. The State of Indiana, City of Bloomington, and Monroe County are signatories to the Consent Decree and those parties have all submitted letters of concurrence for the implementation of the passive quarry drain and groundwater interceptor trench with carbon treatment.



Richard C. Karl

Director, Superfund Division

9/26/06
Date

**RECORD OF DECISION AMENDMENT
BENNETT'S DUMP
OPERABLE UNITS 2 AND 3**

SITE NAME, LOCATION, AND BRIEF DESCRIPTION

CBS Corporation (formerly known as Westinghouse Electric Corporation and formerly known as Viacom Inc.) owned and operated an electrical capacitor production facility in Bloomington, Indiana. The insulating fluid used in the manufacture of the electrical capacitors contained polychlorinated biphenyls (PCBs). During the 1960s, a portion of the Bennett's Stone Quarry, located 2.5 miles northwest of Bloomington, Indiana (the Site), was used as an uncontrolled dump for electrical parts and capacitors containing PCB dielectric fluid. Figure 1 shows the location of the Site. Only a portion of Bennett's Stone Quarry was used for disposal activities and the disposal areas are referenced as Bennett's Dump.

The Bennett's Dump Site was placed on the National Priorities List in September 21, 1984, and was one of the six sites subject to a Consent Decree entered by the United States District Court for the Southern District of Indiana on August 22, 1985. Parties to the Consent Decree are the United States Environmental Protection Agency (EPA), the State of Indiana, the City of Bloomington, Monroe County, and CBS Corporation. CBS Corporation, with assistance from the governmental parties, has led the investigation at the Site.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Monroe County first discovered the Bennett's Dump site and the EPA did an initial site inspection on May 12, 1983. The initial condition of this site indicated that most of the electrical parts visible at the site had been crushed, burned, or otherwise destroyed as evidenced by insulator wrapping paper, ceramic bushings, and other electrical parts scattered about the dump. Stained soil was also evident on surface soil. Another area of the dump, referred to as the satellite area, is located approximately one hundred feet to the east of the main area. The satellite area is approximately one half acre in size.

Sampling showed large concentrations of PCBs across the site. To address this contamination, EPA initiated an interim remedial measure in June 1983. The interim remedial measures included the following:

- Installation of a locked, 8-foot high chain link and barbed wire security fence surrounding the contaminated areas.
- A total of 252 visible capacitors were removed for off-site incineration and 20 cubic yards of stained soil were excavated and disposed of in an approved off-site landfill.
- A cap consisting of between 16 and 22 inches of clay with a 6 inches of topsoil cover was installed over the main site.

The plan for the final remedial action at Bennett's Dump was memorialized in a civil judicial Consent Decree that was entered by the United States District Court for the Southern District of Indiana in 1985. The 1985 Consent Decree called for the construction of a permitted, TSCA-approved, incinerator to be used to destroy PCB-contaminated soils and materials excavated from six sites, including the Bennett's Site. The other five sites addressed by the Consent Decree are the Anderson Road Landfill, the Winston Thomas Sewage Treatment Plant, Neal's Landfill, Neal's Dump, and Lemon Lane Landfill.

Public opposition to the incinerator arose before and after entry of the Consent Decree. CBS submitted applications for the necessary permits to design and build the incinerator in 1991. The Indiana State Legislature, however, passed several laws which prevented any immediate consideration of CBS's permit applications. In February 1994, the parties agreed to a set of principles to guide the process of exploring remedies to substitute for the incinerator remedy. These principles (known as the Operating Principles) provided for, among other things, the selection of remedial alternatives that would be conducted in accordance with EPA's ROD Amendment process.

In November 1997, Judge S. Hugh Dillin issued an Order requiring that the six Consent Decree sites be remediated by December 1999. Judge Dillin also assigned Special Master Kennard Foster to oversee the progress of the parties toward meeting the December 1999 deadline. On February 1, 1999, Judge Dillin issued another Order approving and adopting the Report and Recommendations of Special Master Kennard Foster which extended the deadline for completion of the source control at the remaining five sites (Anderson Road Landfill was already completed) by December 31, 2000, and ordered the parties to implement the source control operable units at three sites and to engage in future settlement discussions with respect to other issues, including remedial measures to address groundwater and surface water contamination. The source control remedies were completed by the December 31, 2000, deadline and CBS and the governmental parties are in the process of negotiating a global settlement¹ for all the remaining issues for the six Consent Decree sites. If a global settlement is not reached among the parties, then EPA may use its enforcement tools, including litigation, to address the cleanup at the site.

The EPA made the source control operable unit Proposed Plan for the Bennett's Dump Site available to the public in 1998. The other governmental parties (IDEM, City of Bloomington, Monroe County) concurred on the source control operable unit ROD Amendment and that ROD Amendment was signed by the EPA on October 16, 1998.

The source control operable unit involved the following:

¹

The global settlement will include both technical and non-technical issues.

- Excavation and off-site disposal at a permitted landfill of all materials containing greater than 25 parts per million (ppm) PCBs on average (estimated total volume of 55,000 cubic yards), followed by placement of 12-inch thick clean soil cover.
- Incineration of PCB-containing capacitors at a permitted incinerator.
- Excavation of sediment in Stout's Creek containing concentrations greater than 1 ppm PCBs with subsequent placement under the clean soil cover.
- Monitoring of groundwater monitoring wells and on-site springs and related deed restrictions.

CBS began excavation activities at the site in August 1999 and disposed of a total of 36,172 tons of PCB-contaminated material in an off-site landfill permitted to accept PCBs. CBS also removed and incinerated a total of 1,756 capacitors (118.72 tons at an off-site incinerator permitted to accept PCBs). CBS then covered the site with a 12-inch soil cover. When cleanup activities were completed in November 1999, the final average PCB concentration of the remaining PCBs in soil was 11.3 ppm. In September of 2000, CBS excavated a total of 10 cubic yards of sediment from Stout's Creek.

During excavation activities in 1999, three deep quarry pits filled with rubble and fill were discovered. Capacitor parts and PCB contaminated soils were found above the rubble and groundwater at these locations had a light, oily sheen. An analysis of this groundwater showed PCBs mixed with diesel fuel. No further material could be removed due to the depth of the excavation and the large amount of groundwater present. As a result, these locations did not meet the soil cleanup criteria.

After completion of the 1999 source control operable unit remediation, a series of periodic flowing springs and seeps developed at the Bennett's Dump Site containing PCBs. These springs discharge directly into Stout's Creek, which flows along the western edge of the Site. Historical analysis of aerial photographs shows springs on the Site, but not at the location of the current springs. Figure 2 shows the location of the various springs and other Site features.

COMMUNITY PARTICIPATION

The community has been involved at the Bennett's Dump Site. The EPA has funded a Technical Assistance Grant (TAG) with a citizens group called Citizens Opposed to PCB Ash (COPA). In addition to hiring experts to review data and technical documents, COPA has also developed a web page (www.copa.org) to distribute information to the public. The EPA and State have participated in, at a minimum, quarterly Citizens Information Committee meetings with the public to update them on the recent site activities. These meetings are televised on the local Bloomington cable access station.

The Proposed Plan for the groundwater operable unit and an additional sediment operable unit for the Bennett's Dump Site was made available for 30 days of public comment on February 3,

2006. A 30-day extension to the public comment period was granted and the public comment period ended on the Proposed Plan on April 4, 2006. The Administrative Record (AR), in electronic form, was placed in the Monroe County Public Library. Interested parties were able to receive copies of the AR for review and for the development of comments on the Proposed Plan. Approximately 5,000 Proposed Plan fact sheets were mailed to residents in the Bloomington area, and a number of individuals provided public comment.

A public meeting was held on February 14, 2006, to present the Proposed Plan to the public. Representatives from EPA and the State of Indiana were present to answer questions. The EPA's responses to comments received during the public comment period are included in the Responsiveness Summary, which is part of this Record of Decision Amendment.

SCOPE AND ROLE OF THE OPERABLE UNITS

This action is the final action for the Bennett's Dump Site and addresses both contaminated groundwater and sediment, known respectively as operable units 2 and 3. The 1998 ROD Amendment did not have a water treatment component. As a result of the new springs that emerged at the Site after the completion of the source control cleanup, EPA conducted an analysis of the continuing releases in a Five-Year Review, dated August 22, 2002, and determined that both a water and sediment operable unit was required. The 1999 cleanup remediated the Site to levels which will allow industrial or commercial development. The 1999 source control cleanup addressed the "principal threat" waste and these final two operable units will address contaminated groundwater and sediment. Since the removal of the contaminated soil and capacitors from the site in November 1999, groundwater PCB-contamination levels at the site have not improved as was expected. Levels greater than 0.1 ppb PCBs have been detected periodically downstream in Stout's Creek. The detections are greater than the national Ambient Water Quality Criteria as described in 40 CFR 129.105. The implementation of the remedial actions in this Operable Unit will:

- Reduce the amount of PCBs released from groundwater to Stout's Creek through mass reduction.
- Reduce the PCB levels in fish for beneficial reuse by reducing PCBs released to Stout's Creek.
- Reduce the amount of PCB mass in sediments that may be available to fish by reducing PCBs released to Stout's Creek.

SITE CHARACTERISTICS

The historical operation at Bennett's Quarry was the quarrying of limestone primarily for building purposes. Specifically, Indiana limestone, a quality dimension building stone, was used for finished building stone, road construction, low magnesium limestone for cement, and high-magnesium limestone for steel production and agricultural application. The Site is no longer

used for quarrying operations. Many of the quarry pits were backfilled with large quarry blocks, stone rubble, and heterogeneous mixtures of soil. Other abandoned quarry pits remain open to the elements and have filled with water over time.

Historical Quarrying Operations

Quarrying operations in the general area of Bennett's Dump were established by 1908, based upon U.S. Geological Survey topographic maps. CBS evaluated a number of aerial photographs of the Bennett's Dump Site from 1939, 1946, 1949, 1954, 1961, 1962, 1967, 1975, 1980, 1983, 1985, 1989, and 1990. This analysis, which is depicted in Figure 3, showed that quarrying activities took place over a large area on, and adjacent to, the Site, and that many (but not all) of the quarry pits were already backfilled at the time of PCB disposal. Therefore, it is likely that most of the PCB disposal occurred in areas overlying backfilled quarry pits, but some disposal may have occurred in small quarry pit areas that had not been backfilled. Former quarry walls were identified during the remediation activities in 1999.

Quarrying activity appears to have caused other significant landscape changes. Soil borings and channel alignments suggest that Stout's Creek formerly flowed through the approximate center of the Site, but was later channelized to its current position along the western site boundary. The former surface channel (a bedrock valley area) through the Site has been filled.

Geology and Hydrogeology

Bennett's Dump is located on the eastern margin of the Mitchell Plain physiographic region, a low plateau developed on limestones of the Mississippian aged Blue River and Sanders Groups. The Mitchell Plain is a well developed karst terrain developed on and within these limestones. Karst terrain is characterized by land forms including sinkholes, subterranean channels, and springs formed by the dissolution of the soluble bedrock. The Salem Limestone (Sanders Group) immediately underlies the Site and was the rock unit that was quarried for dimension stone.

Stout's Creek is the main surface water body associated with Bennett's Dump and flows from south to north along the western edge of the Site. Slaughterhouse Spring, which is connected hydrologically to the Lemon Lane Landfill, and other small springs in the Slaughterhouse area form the headwaters of Stout's Creek. All known springs and surface storm water from the Site eventually flow into Stout's Creek. Open quarry pits in the area collect surface water and groundwater. The water from the quarry pits also seeps into Stout's Creek. Upstream of Bennett's Dump, sampling within Stout's Creek has not shown PCBs (one sample in 2003 did show PCBs just above the detection limit in upstream sampling, but was an estimated sample). Sampling adjacent to and downstream of the Site has shown PCBs at concentrations generally below 1 part per billion (ppb).

The groundwater flow system associated with the Site is composed of recharge areas, flow areas, and discharge areas. Recharge to the groundwater flow system occurs in the topographically higher areas east and south of the Site, in part through open water-filled quarry pits and through

old backfilled quarry pits. Surface water runoff is a contributing source of water to both open and backfilled quarries.

There are four springs within the Bennett's Dump Site, (Middle Spring, Mound Spring, North Spring, and Mid-north Spring). See Figure 2. An additional spring is located on the Site within the channel of Stout's Creek referred to as Rusty Spring. None of these springs flow continuously and there is seasonal variation in the spring flow regime. Generally, the lower elevation springs have the longer duration of flow. Both Mid-north and North Springs flow for only brief periods during extremely wet periods while Mound and Middle Springs flow consistently except during extended dry periods.

Routine PCB monitoring and flow estimates at the four major springs have continued since the completion of the remediation activities in 1999. In April 2002, a Long-Term Groundwater Monitoring Plan was implemented which required quarterly monitoring of all springs, continuous monitoring of Middle and Mound Springs, and estimating flow rates for both North and Mid-north Springs. Rusty Spring has been sampled periodically since October 2003, when it was found.

Mound Spring has periodically ceased flowing approximately 25 percent of the time (8 out of 33 monthly monitoring periods). The PCB content in the water ranges from 0.57 ppb to 7.3 ppb, with a median value of 1 ppb. Spring flow during non-storm events ranges from 1.7 gallons per minute (gpm) to 20 gpm with an average flow of approximately 10 gallons per minute. Storm sampling has shown PCB values peaking around 25 ppb with flow rates peaking at less than 100 gpm. Flow on average during storm events rises 5 to 15 gallons per minute compared to non-storm flow. Following such storm events, it typically takes two to three days for water flow to return to its pre-storm rate.

The flow pattern indicates that the springs are not fed by conduits in the karst bedrock. For example, at karst springs associated with Neal's Landfill and Lemon Lane Landfill, storm events produce much higher flows from the springs and higher PCB concentrations, because a flushing of PCBs from within the karst conduits occur.

Middle Spring has also been evaluated during both non-storm and storm periods. Middle Spring has a longer flow duration (dry during only 3 out of 39 monitoring events). During non-storm events, Middle Spring has a flow range from 0 to 12 gpm with a mean of approximately 3 gpm. PCB concentrations at Middle Spring are generally higher than at Mound Spring, and have ranged from 2.1 ppb to 17 ppb with most concentrations under 10 ppb. During storm events, there is only a small flow response with a rise in flow of 5 to 9 gpm. As with Mound Spring, neither the flow, nor the PCB response during storm events, are indicative of a typical karst conduit-fed spring.

Mid-north Spring and North Spring flow only during very wet periods. For example, North Spring has been dry except for 1 sampling event since November 1999. Mid-north Spring has registered flow 8 out of 25 monitoring events since June 2000. PCB concentrations in Mid-north Spring were less than 1 ppb.

Rusty Spring has been sampled periodically since October 2003. Flow has been estimated to be around 1 gpm with a PCB concentration of approximately 5 ppb.

To determine if additional springs may be present along the banks of Stout's Creek, CBS conducted PCB sampling within Stout's Creek to see if the PCBs present in the creek could be accounted for by the known spring discharges. If different PCB concentrations were discovered within the creek at different locations, then additional springs could be present. PCB mass balance calculations suggest that there may be additional PCB inputs to Stout's Creek not associated with the known springs discussed above.

Piezometers installed by CBS Corporation indicate that a buried bedrock valley is present that is oriented north-south through the middle of the Site. The elevation of bedrock in this valley is generally lower than the present channel of Stout's Creek. This valley contains some sand and gravel material at the top of rock, which, together with the elevation data, indicates that the valley may have been a former channel for Stout's Creek. This channel appears to rejoin the present Stout's Creek channel at the northern fringe of the Site. Railroad tracks adjacent to Stout's Creek were used by the quarry and the railroad berm was constructed over this channel and may be impeding flow within this channel, causing some groundwater mounding in the northern portion of the Site.

Quarry Pits

Under the oversight of EPA and the State, CBS has extensively investigated three open quarry pits at the Site, known as Wedge Quarry, Wedge South Quarry (collectively the Wedge Quarry Complex) and Icebox Quarry. The pits are filled with water, and sampling of this water has shown contamination consistently present at around 0.1 ppb in Icebox Quarry. Water in the Wedge Quarry Complex has been consistently non-detect for PCBs.

A buried quarry designated "Pit A" lies to the east of the Site and is just north of Wedge Quarry (See Figure 3). This pit has a water pool at the surface that has neither been observed to freeze in the winter nor been observed to dry out during dry summer periods. This indicates a source of groundwater recharge to this pit. The investigation of the quarry pits has focused on their influence on the spring flow. Observations during dry periods when both Middle and Mound Springs ceased to flow relate to a water level in the Wedge Quarry Complex of approximately 739 to 740 feet above mean sea level (msl). Further, it was observed that water in Mound Spring and in the Wedge Quarry Complex shared a unique characteristic in that the conductivity of the water was elevated. It is believed that the elevated conductivity of the water in the Wedge Quarry Complex is a result of road salt from runoff from the nearby highway. The fact that the water emerging from Mound Spring had similar conductivity indicates that the Wedge Quarry Complex may be recharging the groundwater to Mound Spring.

To test this theory, CBS conducted a series of pump down tests of the Wedge Quarry Complex to determine if draining the Wedge Quarry Complex had the potential to reduce spring flow by limiting the groundwater recharge. The results from tests confirmed the theory. The initial

short-term pump down of Wedge Quarry Complex to a 737 foot msl showed that the flow at Mound Spring was reduced to zero. A second long-term pump down test at all three quarry pits diminished groundwater recharge to much of the Site and sharply reduced the flow at Mound Spring, if not eliminating the flow altogether. These two tests clearly showed that reducing the water level in the pits would reduce the amount of contaminated groundwater emerging from the springs. The tests also showed that reducing the water levels in the pit would not wholly eliminate the on-going releases from the springs. Middle Spring, for example, was only slightly affected by the pump down of the Wedge Quarry Complex. In November 2005, CBS pump tested two wells in the buried creek channel to determine the effectiveness of capturing groundwater flowing along the bedrock valley. The results of the test showed that the pumping wells were able to control only a portion of the groundwater flow.

Sediment Data

Additional sediment sampling has occurred since the removal of contaminated sediment within Stout's Creek in 2000. The North Park Development Group completed sediment sampling in Stout's Creek subsequent to the cleanup in 2000. The results showed that the continuing release of PCBs into Stout's Creek has not re-contaminated sediment to levels greater than 1 part per million (ppm) PCBs. CBS also completed additional sediment sampling in November 2005, and the results also showed PCBs less than 1 ppm with many samples below the detection limit.

CURRENT AND POTENTIAL FUTURE LAND AND WATER USES

The Bennett's Dump Site is located in a former quarrying operation. The source control operable unit, which consisted of a cleanup of soil and sediment, remediated the main Site area to levels which will permit industrial/commercial development. Currently, the area surrounding the Site is rural with a few commercial businesses and residential homes. A large development by the North Park Development Group is underway and surrounds the Site. This large development will be a mixture of both commercial and residential properties. The Bennett's Dump Site is within the boundaries of the development and institutional controls will be required in the final remedy.

Three houses within a one-mile radius of the Site use groundwater for drinking water. Recent and historical sampling has shown that PCBs have not affected these drinking water wells. The new development will not be using groundwater as a drinking water source, and instead will use City of Bloomington water which comes from Lake Monroe. Incidental ingestion of water and sediment by children playing, wading, or swimming in Stout's Creek was evaluated in the Human Health Risk Assessment.

SUMMARY OF SITE RISKS

EPA completed two focused risk assessments for the purpose of quantifying the threat to public health and the environment from actual or threatened releases of hazardous substances into the environment. One risk assessment focused upon the current and future effects of such releases

on human health. The other assessment focused upon the current and future effects of such releases upon the environment. Each risk assessment is discussed, in turn, below.

Human Health Risks

A Superfund human health risk assessment estimates the baseline risk to human health. This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a Site. To estimate the baseline risk at a Superfund site, EPA undertakes a four-step process:

- Step 1: Analyze Contamination
- Step 2: Estimate Exposure
- Step 3: Assess Potential Health Dangers
- Step 4: Characterize Site Risk

In Step 1, EPA evaluates the data collected at a particular site to determine which data is appropriate to consider in the risk assessment. For example, the most recent data are used, rather than historical data, because concentrations of PCBs in water and fish tissue can change over time and current data are most reflective of future concentrations. Next, EPA looks at the concentrations of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies helps EPA to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, EPA considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, EPA calculates a reasonable maximum exposure (RME) scenario, which represents the highest level of human exposure that could reasonably be expected to occur.

In Step 3, EPA uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. EPA considers two types of risk: cancer and non-cancer risk. The likelihood of any cancer resulting from a Superfund site is generally expressed as an upper bound probability; for example, a 1 in 10,000 chance. In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For non-cancer health effects, EPA calculates risk differently. The key concept here is that a threshold level exists below which non-cancer health effects are no longer predicted. This threshold level is conservatively represented by a reference dose (RfD). Non-cancer risks are calculated as the ratio of potential exposure to the RfD; this ratio is referred to as a hazard quotient (HQ). A HQ of greater than 1 indicates a potential for adverse health effects.

EPA calculated the PCB risk by two methods (Aroclor and Toxicity Equivalent). As background, PCBs are mixtures of up to 209 individual chlorinated compounds called congeners.

Many commercial PCB mixtures are known in the United States as Aroclors. Laboratory analysis included measuring PCBs by the Aroclor method and the congener method. With the congener method, thirteen of the 209 congeners are referred to as dioxin-like PCBs as they produce a toxic response similar to the toxic response produced by exposure to dioxin. The concentration of each congener is converted to a dioxin equivalent which is referenced as the toxicity equivalent (TEQ).

In Step 4, EPA determines whether site risks are great enough to cause health problems for people at, or near, the Superfund site. The results of the three previous steps are combined, evaluated and summarized. EPA adds up the potential risks from the individual contaminants and exposure pathways and calculates a total site risk.

In evaluating the human health risks posed by the on-going releases from Bennett's Dump, EPA focused on the health effects of PCBs to children playing in Stout's Creek, as well as children and adults eating PCB-contaminated fish caught in Stout's Creek. In 1996, the Agency for Toxic Substances and Disease Registry (ATSDR) completed its public health assessment of the Bloomington PCB sites and concluded, among other things, that neither children nor adults are likely to engage in activities in Stout's Creek that would lead to significant exposures to site-related contaminants. At the time this report was issued, however, the ATSDR noted that the Bennett's Stone Quarry Site was in a sparsely populated area with fewer than 10 households within a 2 mile of the Site. This is no longer accurate. A portion of the Bennett's Dump Site is now within the boundaries of the North Park Development. This new development consists of both residential and commercial buildings, which will be built within 2 mile of the Site. Notwithstanding the close proximity of the North Park Development to the Site, EPA does not believe that the ongoing releases pose a threat to the drinking water supplies for the development. The North Park Development will obtain potable water from the City of Bloomington. While there are three households within one mile of the Site that use groundwater for drinking water, none of the wells associated with these households have tested positive for PCBs.

EPA believes that human exposure to PCBs from the Site result from three pathways:

- Consumption of PCB-contaminated fish caught in Stout's Creek
- Exposure to sediment in Stout's Creek through skin contact and incidental ingestion
- Exposure to surface water in Stout's Creek through skin contact and ingestion

To determine the risks posed by the first pathway, fish tissue samples were collected at three locations intersecting Stout's Creek. These locations are as follows:

- Hunter Road (1 mile from the Site)
- Acuff Road (3 miles from the Site)

- W. Maple Grove Road (5 miles from the Site)

As part of evaluating risks to humans from the consumption of fish from Stout's Creek, an analysis of the number of fish within the Creek was completed to determine whether enough fish were living in the Creek to be available to consume. The size of the fish are also taken into consideration in developing the amount of fish that can be consumed along with a factor for converting whole fish sample results to an edible fillet sample. The results showed that from a human health standpoint, edible fish at the Hunter Road sampling location are available in sufficient numbers to support consumption of one quarter pound fish meal every three months (1 gram of fish tissue per day). Similarly, edible fish at the Acuff Road and W. Maple Grove Road locations are available in sufficient numbers to support consumption of one quarter pound meal per month (3 grams of fish tissue per day). Using EPA risk assessment guidance and procedures to calculate cancer and non-cancer risk, the following is a summary of the risk at the three sampling locations:

Location	Risk		Hazard	
	PCB	TEQ	PCB	TEQ
Hunter Road				
Green Sunfish (fillet)	3.1E-06	NA	1.8E-01	NA
Green Sunfish (whole)	5.1E-06	3.1E-06	3.0E-01	4.8E-02
Acuff Road				
Green Sunfish (fillet)	1.2E-05	NA	7.3E-01	NA
Green Sunfish (whole)	7.4E-06	4.7E-06	4.3E-01	7.3E-02
White Sucker (whole)	4.8E-05	2.8E-05	2.8E+00	4.4E-02
Combination	2.9E-05	1.6E-05	1.7E+00	2.5E-01
W. Maple Grove Rd				
Green Sunfish	4.4E-06	NA	2.6E-01	NA
Longear Sunfish	3.2E-06	4.8E-06	1.9E-01	7.5E-02
White Sucker	9.6E-06	8.7E-06	5.6E-01	1.4E-01
Combination	6.7E-06	6.8E-06	3.9E-01	1.1E-01

Using the EPA point of departure of 1 in 1,000,000 (1 E-06) excess cancer risk and hazard index greater than 1, evaluating the risk at Acuff Road shows that an unacceptable cancer risk through consumption of PCB-contaminated fish is present. A single set of risks associated with incidental ingestion and skin (dermal) contact with contaminated sediment and surface water in Stout's Creek were calculated for all three locations and are as follows:

- Incidental ingestion and dermal contact with sediment produces a cancer risk of lower than 1 in 10,000,000 and non-cancer hazard quotient of less than 0.02.
- Incidental ingestion of water from Stout's Creek produces a cancer risk of 1 in 1,000,000 and a non-cancer hazard quotient of less than 0.02.

- Dermal contact with water is associated with a cancer risk of 3 in 100,000 and non-cancer hazard quotient of 1.6.

At W. Maple Grove Road, both the cancer and non-cancer risks from fish consumption are not as great as at Acuff Road, because the PCB concentrations in fish found at W. Maple Grove Road are lower than the PCB concentrations found in fish at Acuff Road. Also, the risk associated with ingestion and dermal contact of water and sediment in Stout's Creek at W. Maple Grove are similar to the risk levels at Acuff Road.

In summary, these results indicate that there are potential risks to both children and adults from ingesting fish and borderline risks associated with dermal contact with water in Stout's Creek. There is not an unacceptable risk, however, with respect to incidental ingestion or dermal contact with sediment.

These risk estimates are based on reasonable maximum exposure (RME) scenarios and were developed by taking into account various conservative assumptions about not only the concentration of PCBs in various media to which humans may be exposed, but also the frequency and duration of an individual's exposure to eating fish or coming into contact with water and sediment from Stout's Creek. In particular, risks associated with potential dermal contact with PCBs in surface water are likely to overestimate actual risks because the risk assessment was based upon PCB concentrations immediately downstream of the Site and did not consider the impact of dilution from the West Branch of Stout's Creek.

Ecological Risks

An ecological risk assessment was completed for the Bennett's Dump Site. The ecological risk assessment focused on whether the PCB-exposure of mammals and birds feeding on PCB-contaminated fish and crayfish from Stout's Creek is high enough to potentially cause reproductive problems in those mammals and birds. Protection of fish-eating birds and mammals is expected to be protective of aquatic organisms as well because the mammals and birds that feed on PCB-contaminated fish are exposed to higher levels of PCBs compared to the fish themselves. Fish-eating mammals are represented by mink, and fish-eating birds are represented by kingfisher.

The exposures of mink and kingfisher to PCBs are based on analyses of fish and crayfish collected from Stout's Creek in 2004. As with the human health risk assessment, the locations are Hunter Road (Station 1), Acuff Road (Station 2), and W. Maple Grove Road (Station 3).

The ratio of fish and crayfish PCB concentrations was used to model PCBs in crayfish at the other two locations, because crayfish were collected only at Acuff Road. Risk is evaluated both for total PCBs and for dioxin toxic equivalents (TEQ). Data on dioxin toxic equivalents are available for only a small subset of the fish collected for the ecological risk assessment, so there is greater uncertainty associated with the risk estimates based on TEQ as compared to the ecological risks assessed based on total PCBs (which have much more sampling data available). Total PCB risks are calculated for both reasonable maximum exposure (RME) based on an upper

estimate of the average PCB exposure, and central tendency exposure (CTE) based on the average measured exposure. Data are insufficient for calculating RME dioxin toxic equivalents, so TEQ risk is calculated only for CTE.

Mink exposure is modeled with a dietary composition of 66% fish, 13% crayfish and 21% prey from land and assuming no PCB contribution from non-aquatic prey. The dietary composition assumptions are based on the results of a Michigan field study. Risk is estimated by hazard quotients (HQ) calculated by dividing the modeled dietary PCB concentrations by the dietary concentration resulting in no adverse effects in mink feeding studies (no effect HQ) and the lowest concentration that caused adverse effects (low effect HQ).

The results for total PCBs show that mink are potentially at risk of adverse reproductive effects at Hunter Road and Acuff Road, with no effect HQs of 9 and 4, respectively, and low effect HQs of 7 and 4, respectively, for the RME scenario. The CTE HQs are similarly elevated at Hunter Road and Acuff Road, with no effect HQs of 7 and 3, respectively, and low effect HQs of 6 and 3, respectively. The TEQ no effect HQs are similar (8 and 4 at Hunter Road and Acuff Road), but the TEQ low effect HQs are lower (2 and 1, respectively) compared to the total PCB HQs. Although the specific values vary among the approaches, all lead to the same conclusion, that mink are potentially at risk at Hunter Road and Acuff Road.

The risk to mink appears to be low at W. Maple Grove Road. The total PCB “no effect” and “low effect” HQs both equal 1 (because of rounding), which indicates that exposure falls within the narrow range between dietary concentrations not associated with adverse effects and those associated with the onset of adverse effects. The TEQ no effect HQ is higher (5), but the low effect HQ is identical (1) to the total PCB HQ.

Kingfisher exposure is modeled with a dietary composition of 80% fish and 20% crayfish. The dietary composition assumptions are based on several field studies in mid-western states. PCB toxicity studies have not been performed with kingfisher. Therefore, to allow use of toxicity data for other species of birds, kingfisher dietary exposure was converted to dose (PCBs per kilogram bodyweight per day). Because the sensitivity of kingfisher to PCBs is unknown, two sets of PCB toxicity values were used to represent higher and lower sensitivities to PCBs. The risk associated with TEQ dose was evaluated with a single high-quality set of toxicity values. TEQ risk was also evaluated through a separate procedure by modeling the accumulation of dioxin-like PCB congeners in kingfisher eggs. The risks associated with TEQ in eggs were assessed with two sets of toxicity values to represent higher and lower sensitivities to dioxin-like effects.

The results for total PCBs show that kingfisher are potentially at risk of adverse reproductive effect at Hunter Road and Acuff Road, with no effect HQ ranging from 3 to 24, and low effect HQ ranging from 1 to 5 for the RME scenario. The CTE HQ are similarly elevated at Hunter Road and Acuff Road, with no effect HQ ranging from 2 to 20, and low effect HQ ranging from 0.9 to 4. The TEQ dose HQ are reasonable consistent with the total PCB risk range, with no effect HQ of 16 and 9 at Hunter Road and Acuff Road, respectively, and low effect HQ of 2 and 0.9, respectively. TEQ egg HQ have a broader range compared to the other approaches, with no effect HQ ranging from 1 to 17, and low effect HQ ranging from 0.3 to 6. Although the values

vary among the approaches, most lead to a similar conclusion that kingfisher are potentially at risk at Hunter Road and Acuff Road. The sole exception is the egg-based risk estimate assuming low sensitivity to dioxin-like effects.

The risk to kingfisher appears to be low at Maple Grove Road based on total PCBs. Although the total PCB “no effect” HQ mostly exceed 1 (0.8 to 4 for CTE and RME), all of the “low effect” HQ are below 1 (0.3 to 0.8 for CTE and RME), which indicates that kingfisher PCB doses at Maple Grove Road are intermediate between doses not associated with adverse effects and those associated with the onset of adverse effects. The TEQ dose HQ are somewhat higher than the total PCB HQ, with a no effect HQ of 10, and a low effect HQ of 1. Again, the egg-based HQ range is very broad, 0.7 to 6 for no effect, and 1 to 10 for low effect. Based on the TEQ approaches, kingfisher risk cannot be ruled out at Maple Grove Road, but based on the total PCB approaches, risk appears to be low.

REMEDIAL ACTION OBJECTIVES

The remedial action objectives (RAOs) provide a general description of what the cleanup will accomplish. The continuing release of PCBs from the spring system connected to the Bennett’s Dump has produced unacceptable risks to human health and the environment. The RAO’s for operable units two and three are as follows:

- Reduce the amount of PCBs released from groundwater to Stout’s Creek through mass reduction.
- Reduce the PCB levels in fish for beneficial reuse by reducing PCBs released to Stout’s Creek.
- Reduce the amount of PCB mass in sediments that may be available to fish by reducing PCBs released to Stout’s Creek.

DESCRIPTION OF ALTERNATIVES

To address the PCB-contamination at the Bennett’s Dump Site, the site investigation was broken up into two operable units, one for water and one for sediment. For operable unit 2, five alternatives, including the No Action Alternative, were evaluated to remediate the PCB-contaminated spring water at the Site. Operable Unit 3 addresses PCB contaminated sediment in Stout’s Creek.

Water Operable Unit

All the alternatives, except the No Action Alternative, have common (or overlapping) components. The No Action Alternative is evaluated as a comparison to the other alternatives. All of the alternatives (except the No Action Alternative) anticipate some type of storm water structures with lined retention basins that are intended to minimize groundwater recharge in the area surrounding the Site, because the area surrounding the Site is scheduled to be developed by

the North Park Development Group. The North Park Development Group has not finalized plans, but the group has been cooperative and has agreed to coordinate its activities with the U.S. EPA and the other parties to the Consent Decree.

Alternative 1: No Action Alternative

Estimated Capital Cost: \$0
Estimated Annual O&M Cost: \$0
Estimated Present Worth Cost: \$0
Estimated Construction Timeframe: None

Regulations governing the Superfund program generally require that the No Action alternative be evaluated generally to establish a baseline for comparison. Under this alternative, U.S. EPA would take no action at the Site to prevent the release of PCBs into Stout's Creek.

Alternative 2: Long-Term Groundwater Monitoring

Estimated Capital Cost: \$0
Estimated Annual O&M Cost: \$4,700
Estimated Present Worth Cost: \$73,322
Estimated Construction Timeframe: None

No additional remedial measures would be implemented with this alternative. Long-term groundwater monitoring for 30 years would take place quarterly at Middle Spring, Mound Spring, Mid-north Spring, Rusty Spring, North Spring and Stout's Creek. Deed restrictions would be placed on the Site to prevent residential development, to prevent deep excavation in the former quarry pits, and to prevent placement of drinking water wells on the Site. Fencing would be required around a portion of the Site to prevent direct contact with the spring water.

Alternative 3: Passive Quarry Drain System

Estimated Capital Cost: \$399,500
Estimated Annual O&M Cost: \$1,700
Estimated Present Worth Cost: \$417,000 at a 7% discount rate and 30 years of operation
Estimated Construction Timeframe: 3 months
Estimated Time to Achieve RAO's: 12 months

The groundwater investigation demonstrates that the flow from the on-site springs can be affected by the water level of the surrounding water filled quarries, particularly the Wedge Quarry Complex (Wedge and Wedge South Quarries). Pump down tests of the Wedge Quarry Complex indicate that maintaining water level of about 736 feet above mean sea level reduces the groundwater recharge in the area and that the pump down greatly reduces (and may eliminate) groundwater flow to some of the on-Site springs. Reducing the water level in Icebox Quarry shows some affect, but not nearly as much as reducing the water level in the Wedge Quarry Complex.

Accordingly, in this alternative, a passive drain would be installed to Stout's Creek from the Wedge Quarry Complex with the intention of lowering the water level in the Wedge Quarry Complex. A passive drainage system through bedrock would be placed from Wedge Quarry to Wedge South Quarry to facilitate the drainage of the Wedge Quarry Complex. Another passive drain into bedrock would be cut from Wedge South Quarry to Stout's Creek upgradient from the Site. This system is to keep the water level in the Wedge Quarry Complex at a 736 foot elevation during low flow and storm events. Direct drainage from the Wedge Quarry Complex to Stout's Creek will not require any treatment, because the water sampled within the quarry has not shown PCB contamination. The Pit A area would also be drained into the Wedge Quarry Complex. In addition, Icebox Quarry may be partially drained either to the Wedge Quarry Complex or directly to Stout's Creek. Icebox Quarry has shown PCB concentrations of 0.1 ppb and water draining from the quarry may require treatment prior to the release to Wedge Quarry Complex. Figure 4 shows a conceptual approach for the Wedge Quarry passive drainage system. Key Applicable or Relevant and Appropriate Requirements (ARARs) for this alternative include the following:

- Under 326 IAC 6-4-2, the State of Indiana has promulgated emission limits for fugitive dust, i.e. particulate matter that escapes beyond the boundaries of the Site.
- Under 326 IAC 6-4-4, the State of Indiana has prohibited any vehicle from driving on any public right of way unless the vehicle has been so constructed as to prevent its contents from escaping and forming fugitive dust.
- 329 IAC 4.1-4 Requirements for storage and disposal of wastes containing PCBs - Under 329 IAC 4.1-4, any sludge, soil, or other material generated by a water treatment facility or excavation of on-Site material must be managed as PCB remediation waste in accordance with 40 CFR ' 761.61.
- 329 IAC 3.1 Universal Waste Rule - Under 329 IAC 3.1, all wastes generated by remediation activities must be analyzed to determine whether the wastes meet the characteristics of hazardous waste. If they meet these characteristics, they must be disposed of in an approved RCRA permitted facility in accordance with 40 C.F.R. " 260-280.
- 329 IAC 10 Solid Waste Land Disposal Facilities - Under 329 IAC 10, all wastes determined to be non-hazardous must be disposed of in a facility permitted to accept such waste.
- The passive quarry drain from Icebox Quarry to Wedge Quarry may require treatment and will not need to obtain a National Pollutant Discharge Elimination System (NPDES) permit because remedial actions are specifically exempt from such administrative requirements under Section 121(e) of CERCLA, 42 U.S.C. '96219(e). Nevertheless, certain regulations enacted by the State of Indiana under its federally-approved NPDES

program are relevant and appropriate to discharges from the plant and the discharges must meet the substantive requirements of any permit that would be issued.

Specifically, the following are action-specific ARARS:

- 327 IAC 2-1-6 Table 1, Surface Water Quality Standards
- 327 IAC 5-2-8 Conditions Applicable to All Permits
- 327 IAC 5-2-11 Considerations in the calculation and specification of effluent limitations
- 327 IAC 5-2-11.1 Establishment of water quality-based effluent limitations for dischargers not discharging water to within the Great Lakes system
- 327 IAC 5-9-2 Applicability of Best Management Practices
- 327 IAC 5-2-13 Monitoring
- As noted previously, the State of Indiana has stated in correspondence that it typically sets an effluent limit of .3 ppb for PCBs discharged by treatment plants into waters other than the Great Lakes System. The State may establish effluent limits for additional constituents if sampling data provided during the remedial design stage indicates the presence of other contaminants at such levels requiring the establishment of effluent limits for those contaminants.

A Long-term Groundwater Monitoring Plan will be developed to monitor the effectiveness of the passive quarry drain system. The monitoring will include any springs which may continue to periodically flow, as well as Stout's Creek and sediment within Stout's Creek. Analysis of fish tissue from Stout's Creek will be conducted.

Institutional controls, such as deed restrictions, would be placed on the Site to prevent residential development, to prevent deep excavation in the former quarry pits, and to prevent placement of drinking water wells on the Site. Fencing may also be required.

Alternative 4: Excavation of Buried Quarry Pits and Passive Quarry Drain (Alternative 3)

Estimated Capital Cost: \$1,320,871

Estimated Annual O&M Cost: \$1,700

Estimated Present Worth Cost: \$1,338,960 at a 7% discount rate and 30 years of operation

Estimated Construction Timeframe: 12 months

Estimated Time to Achieve RAO's: 18 months

Based upon the 1999 excavation, it is known that the filled-in, buried quarry pits on and near the Site contain residual PCBs. The PCBs in the filled-in, buried quarry pits on and near the Site are a source of the PCBs that contaminate the springs and are eventually released to Stout's Creek.

The quarry pits are filled with rubble and fill material and the disposal of PCBs at these areas has contaminated the material deep in the pits which could not be removed during the 1999 cleanup. Groundwater in the quarry pits becomes contaminated by the residual PCBs and are released to Stout's Creek through the on-site springs.

In this alternative, the buried quarry pits near the former area of deeply buried residual PCB contamination would be excavated to a level of 25 ppm. Figure 3 shows the general area of excavation. The PCB-contaminated material excavated from the quarry pits would be disposed of off-site in a landfill permitted to accept PCB waste. The volume of PCB-contaminated material is estimated to be 3,000 cubic yards. Large pieces of rubble within the quarry pits would be placed back into the pit if the rubble is uncontaminated. Clean fill would replace the removed material and the excavated areas returned to the current grade. In addition, all of the remedial action components of Alternative 3 would also be implemented as part of this Alternative.

Key ARARs for this alternative include the following:

- Under 326 IAC 6-4-2, the State of Indiana has promulgated emission limits for fugitive dust i.e. particulate matter that escapes beyond the boundaries of the Site. These emission limits are relevant and appropriate with respect to dust resulting from the excavation of the Site.
- Under 326 IAC 6-4-4, the State of Indiana has prohibited any vehicle from driving on any public right of way unless the vehicle has been so constructed as to prevent its contents from escaping and forming fugitive dust.
- 329 IAC 4.1-4 Requirements for storage and disposal of wastes containing PCBs - Under 329 IAC 4.1-4, any sludge, soil, or other material generate by a water treatment facility or excavation of on-site material must be managed as PCB remediation waste in accordance with 40 CFR ' 761.61.
- 329 IAC 3.1 Universal Waste Rule - Under 329 IAC 3.1, all wastes generated by remediation activities must be analyzed to determine whether the wastes meet the characteristics of hazardous waste. If they meet these characteristics, they must be disposed of in an approved RCRA permitted facility in accordance with 40 C.F.R. " 260-280.
- 329 IAC 10 Solid Waste Land Disposal Facilities - Under 329 IAC 10, all wastes determined to be non-hazardous must be disposed of in a facility permitted to accept such waste. This requirement is relevant and appropriate with respect to waste generated by the excavation of Site.
- 326 IAC 2-4.1 Major Sources of Hazardous Air Pollutants - Under 326 IAC 2-4.1, any owner or operator who constructs a major source of hazardous air pollutants (HAP) shall comply with the requirements of this section. PCBs are a HAP. Thus, this section is

relevant and appropriate to the extent that the selected remedy would involve the construction of a major source of HAP. Under 40 C.F.R. ' 63.41, the term construct a major source means to fabricate, install or erect a new process or production unit which emits or has the potential to emit 10 tons per year of any HAP. EPA does not anticipate that this alternative would meet this threshold limit.

- 326 IAC 2-5.1-3(a)(1)(D) Permits for New HAP Source - Under 326 IAC 2-5.1-3(a)(1)(D), a source of HAP that has the potential to emit ten tons per year of HAP must apply for a construction and operating permit. A source with lower emissions is exempt. To the extent that any of the proposed remedies would have the potential to emit ten tons per year of HAP, the remedy would need to comply with the substantive requirements of a permit, although no permit would be issued for the Site.
- 326 IAC 2-5.1-2(a)(1)(A) Registrations - Under 326 IAC 2-5.1-2(a)(1)(A), a source of HAP that has the potential to emit five tons per year of either particulate matter, or particulate matter less than 10 microns, must apply for a registration. A source with lower emissions is exempt. To the extent that any of the proposed remedies would have the potential to meet or exceed this threshold limit, the remedy would need to comply with the substantive requirements of the registration rule, although registration will not be required for the Site. EPA does not anticipate that this alternative would meet this threshold.

A Long-term Groundwater Monitoring Plan will be developed to monitor the effectiveness of the passive quarry drain system and the excavation. The monitoring will include any springs which may continue to periodically flow, Stout's Creek, sediment within Stout's Creek. Analysis of fish tissue from Stout's Creek will be conducted.

Institutional controls, such as deed restrictions, would be placed on the Site to prevent residential development, to prevent deep excavation in the former quarry pits, and to prevent placement of drinking water wells on the Site. Fencing may also be required.

Alternative 5: Passive Quarry Drains with Interceptor Trench and Carbon Treatment

Estimated Capital Cost: \$831,900

Estimated Annual O&M Cost: \$28,000

Estimated Present Worth Cost: \$1,189,972 at a 7% discount rate and 30 years of operation

Estimated Construction Timeframe: 12 months

Estimated Time to Achieve RAO's: 18 months

In this alternative, the passive quarry drain described in Alternative 3 would be implemented, along with the addition of a groundwater interceptor trench with carbon treatment for the captured groundwater. The treated groundwater would be discharged to Stout's Creek. In this alternative, the groundwater would be contained and treated to prevent the release of PCBs and other hazardous constituents from reaching Stout's Creek. The conceptual design of the interceptor trench would be to locate the trench along the west side of the Site. The interceptor

trench would be approximately 800-feet long and 8 feet deep from the top of bedrock. The final depth will be determined in the design phase. It is assumed that groundwater flow will be a maximum of 100 gallons per minute during storm events. Figure 5 shows a conceptual approach for the interceptor trench.

A pre-design study will be required with this alternative. The pre-design study will occur after the installation of the passive quarry drain system, and the study will determine how groundwater flow and PCB contamination is affected by the passive quarry drain system. The interceptor trench may then be designed based upon the pre-design study results. The State of Indiana will provide substantive requirements of the National Pollution Discharge Elimination System (NPDES) water discharge limits, because the captured water will be treated on-site and discharged to Stout's Creek. This discharge, however, will be completed on-site and under the Superfund law the State will only provide substantive requirements, because the discharge is exempt from administrative permitting requirements.

Through correspondence, the State of Indiana has identified 327 IAC 5-2-11.1 as a relevant and appropriate cleanup standard, standards of control, and other substantive requirements, criteria, or limitations in determining PCB discharge criteria for any water treatment plant built at Bennett's Dump. 327 IAC 5-2-11.1 provides an alternate way to determine a cleanup level for PCBs where the WQBEL for PCBs is 0.79 part per trillion and, therefore, is less than the limit of quantitation normally achievable and determined by the Indiana to be appropriate for PCBs. As an alternative and consistent with its regulations, Indiana identified an approved analytical methodology that reliably can disclose PCBs in effluent at concentrations of 0.3 ppb. This higher discharge criteria is based upon an approved laboratory method and is appropriate where the 0.79 ppt is less than the limit of quantitation.

Key ARARs for the water treatment component of this alternative include the following:

The fifth remedial alternative requires the construction and operation of an on-site water treatment plant. This plant will not need to obtain a National Pollutant Discharge Elimination System (NPDES) permit because remedial actions are specifically exempt from such administrative requirements under Section 121(e) of CERCLA, 42 U.S.C. '96219(e). Nevertheless, certain regulations enacted by the State of Indiana under its federally-approved NPDES program are relevant and appropriate to discharges from the plant.

Specifically, the plant is subject to the following action-specific ARARS:

- 327 IAC 2-1-6 Table 1, Surface Water Quality Standards
- 327 IAC 5-2-8 Conditions Applicable to All Permits
- 327 IAC 5-2-11 Considerations in the calculation and specification of effluent limitations
- 327 IAC 5-2-11.1 Establishment of water quality-based effluent limitations for dischargers not discharging water to within the Great Lakes system

- 327 IAC 5-9-2 Applicability of Best Management Practices
- 327 IAC 5-2-13 Monitoring

As noted previously, the State of Indiana has stated in correspondence that it typically sets an effluent limit of .3 ppb for PCBs discharged by treatment plants into waters other than the Great Lakes System. The State may establish effluent limits for additional constituents if sampling data provided during the remedial design stage indicates the presence of other contaminants at such levels requiring the establishment of effluent limits for those contaminants. Neither EPA, nor the State of Indiana, has any such information now, but during the source control cleanup in 1999, diesel fuel, containing volatile and semi-volatile compounds was found. If appropriate, the State of Indiana will determine effluent limits for such contaminants. The plant will meet this effluent limits.

Key ARARs for the passive quarry drain and interceptor trench components of this alternative include the following:

- Under 326 IAC 6-4-2, the State of Indiana has promulgated emission limits for fugitive dust i.e. particulate matter that escapes beyond the boundaries of the Site.
- Under 326 IAC 6-4-4, the State of Indiana has prohibited any vehicle from driving on any public right of way unless the vehicle has been so constructed as to prevent its contents from escaping and forming fugitive dust.
- 329 IAC 4.1-4 Requirements for storage and disposal of wastes containing PCBs - Under 329 IAC 4.1-4, any sludge, soil, or other material generate by a water treatment facility or excavation of on-site material must be managed as PCB remediation waste in accordance with 40 CFR ' 761.61.
- 329 IAC 3.1 Universal Waste Rule - Under 329 IAC 3.1, all wastes generated by remediation activities must be analyzed to determine whether the wastes meet the characteristics of hazardous waste. If the wastes meet these characteristics, they must be disposed of in an approved RCRA permitted facility in accordance with 40 C.F.R. " 260-280.
- 29 IAC 10 Solid Waste Land Disposal Facilities - Under 329 IAC 10, all wastes determined to be non-hazardous must be disposed of in a facility permitted to accept such waste.

An Operations and Maintenance Plan will be developed for the treatment system. A groundwater monitoring plan will be developed along with a plan to monitor the treated water discharged pursuant to the NPDES substantive requirements. The Long-term Groundwater Monitoring Plan will be developed to monitor the effectiveness of the passive quarry drain

system. The monitoring will include any springs which may continue to periodically flow, as well as Stout's Creek and sediment within Stout's Creek. Analysis of fish tissue analysis from Stout's Creek will be conducted.

To be protective of human health and the environment, each active alternative described within this ROD requires use or access restrictions within the boundaries of the Site. Use restrictions or access restrictions would be implemented through the use of institutional controls. Institutional controls are administrative or legal constraints that minimize the potential for exposure to contamination by limiting land or resource use. Specific actions taken at sites to restrict access or use could include: Governmental Controls - such as zoning restrictions or ordinances; Proprietary Controls - such as easements or covenants; Enforcement Tools - such as consent decrees or administrative orders; and Informational Devices- such as deed notices or state registries. Several types of access or use restrictions employed simultaneously can increase the effectiveness of institutional controls.

It is anticipated that institutional controls will be needed for the Site since the Site will have contaminants remaining at levels that do not allow unrestricted use or unlimited access. The goal of these institutional controls is to prevent residential development, to prevent deep excavation in the former quarry pits, and to prevent placement of drinking water wells on the Site. Fencing may also be required.

Preventing residential development and deep excavation will prevent direct contact exposure with the residual contamination. Therefore, digging or disturbance on the Site (or underlying contaminated material) will be prevented. There will be a program of Operation, Monitoring and & Maintenance, and this will include routine inspection. It is anticipated that institutional controls will be relatively simple to develop, likely through a layered approach, including: proprietary controls (easements and/or covenants); deed restrictions; and enforcement tools (AOCs and/or consent decrees), which will ensure the long-term reliability of the controls. Institutional controls are also needed to control use of groundwater. The goals of these institutional controls are: to prevent use of and exposure to (ingestion, dermal contact) groundwater. Therefore, installation of groundwater production wells will be prevented. Additionally, new construction over areas where contamination exists will be prevented, or the construction will be outfitted so as not to disturb the underlying contamination. There will be a program of Operation, Monitoring and & Maintenance, and this will include routine inspection to ensure that no new production wells or buildings have been constructed.

Sediment Operable Unit

Due to the continuing release of PCBs from the springs into Stout's Creek, additional sampling of sediment in Stout's Creek was completed subsequent to the sediment cleanup in 2000. Using the recent sediment sampling data and evaluating the risk with respect to sediment in Stout's Creek, the risk posed to adults and children from the incidental ingestion and dermal contact produces a cancer risk lower than 1 in 1,000,000 and a non-cancer hazard quotient of less than 1 of 0.02. Evaluating both the carcinogenic and non-carcinogenic risk for the sediment, it has been determined that they are within acceptable risk levels. Further, it is unlikely that EPA could

further reduce the risk in light of the small amount of sediment in Stout's Creek and low level of PCB contamination in the sediment. Therefore, the sediment in Stout's Creek will not require remediation and will not be evaluated further.

COMPARATIVE ANALYSIS OF ALTERNATIVES

EPA uses nine criteria to evaluate the remedial alternatives against each other to determine the most appropriate remedy for the Site. Each alternative is compared to each of the other alternatives to determine which alternative achieves the best balance of the nine criteria.

Overall Protection of Human Health and the Environment

The overall protection of human health and the environment criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Excluding the No Action alternative (Alternative 1) and long-term groundwater monitoring alternative (Alternative 2), the remaining alternatives would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls, and institutional controls. Alternative 3 assumes that the groundwater flow would be greatly reduced, even during storm events and, therefore, that the continuing release of PCBs would be greatly minimized. Alternative 4 would reduce the releases to Stout's Creek through excavation of the PCBs within the buried quarry pits, and would further reduce the release of any residual PCBs to Stout's Creek by controlling groundwater by employing the passive drain system. Alternative 5 would control groundwater flow by employing the passive drain system and any remaining PCBs releases would be captured and eliminated through on-site treatment.

The no action alternative and long-term groundwater monitoring alternative would not be protective of human health and the environment. Accordingly, these two alternatives have been eliminated from consideration under the remaining eight criteria.

Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP Section 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs", unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those State standards that are identified by a State in a timely manner and that are more stringent

than Federal requirements may be applicable. Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility siting laws that, while not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well-suited to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

The compliance with ARARs criterion addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking waiver.

Excluding alternatives 1 and 2, the remaining alternatives have common ARARS associated with the installation of the passive quarry drain. Discharge of treated water to Stout's Creek will not require a permit but the discharge must meet the substantive requirements. The State of Indiana has stated in correspondence that it typically sets an effluent limit of .3 ppb for PCBs discharged by treatment plants into waters other than the Great Lakes System. The State may establish effluent limits for additional constituents if sampling data provided during the remedial design stage indicates the presence of other contaminants at such levels requiring the establishment of effluent limits. Recent sampling of the springs has shown that other hazardous constituents are not present but a final determination regarding other constituents will be made by the State during the pre-design study.

Alternatives 3, 4, and 5 will attain their respective Federal and State ARARs.

Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence criterion refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternatives 3, 4, and 5 each provide some degree of long-term protection. Each alternative reduces the release of PCBs into Stout's Creek. Alternative 3 alone likely would not control all of the PCB releases, especially during large storm events. Alternative 4 includes excavating the PCBs in the buried quarries and controlling spring flow through the installation of the passive quarry drain. However, due to the residual PCBs, during storm events the springs may continue to release PCBs. Alternative 5 includes the passive drain system (which will reduce the release of PCB-contaminated water), and includes the capture of PCB-contaminated water that is released by employing a collection trench. The captured PCB-contaminated water is then treated through carbon adsorption.

Reviews at least every five years, as required, would be necessary to evaluate the effectiveness of each of these alternatives, because hazardous substances would remain on-site in concentrations above acceptable health-based levels.

Reduction of Toxicity, Mobility, or Volume Through Treatment

The reduction of toxicity, mobility, or volume through treatment criterion refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 3 would address the mobility of PCBs and other hazardous constituents by reducing the amount of groundwater released to Stout's Creek, but this alternative does not reduce the toxicity or volume through treatment. Alternative 4 reduces the mobility of contaminants through groundwater control. The excavation of the quarry pits will reduce the potential of PCBs to be released through groundwater. Alternative 4 does not reduce the toxicity of the PCBs, because the excavated material from the quarry pits will be disposed of off-site in a permitted landfill capable of accepting PCBs. Alternative 5 does reduce the toxicity, mobility, or volume through treatment by using groundwater control and groundwater capture in an interceptor trench with the subsequent carbon adsorption treatment of groundwater. The carbon from the water treatment plant residuals will be managed in accordance with the Resource Conservation Recovery Act.

Short-Term Effectiveness

The short-term effectiveness criterion addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternatives 3, 4, and 5 can all be implemented without risk to workers, nearby residents, and the environment. Alternative 4 has the highest potential for short-term risk due to the excavation of PCBs and other hazardous constituents which may volatilize into the air. Air monitoring at the excavation perimeter and worker monitoring would be conducted to ensure the protection of public health and the environment. The short-term risk to construction workers and potential contact with contaminated groundwater will be eliminated through engineering controls and the implementation of health and safety protocols.

Alternative 4 would require the longest actual construction period due to the excavation activities and should be completed in one construction season. Alternative 5 will require the implementation first of the passive drain system to determine the final volume of water which will require collection and treatment. Alternative 5 may require 18 months or longer to complete, because the passive drain system would need to be installed prior to designing the collection/treatment system. The collection and treatment system may require operation and maintenance for at least 30 years.

Implementability

The implementability criterion addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternatives 3, 4, and 5 can be implemented. The excavation portion of Alternative 4 may be problematic, because excavating within a buried quarry may require specialized equipment to reach the necessary depths and to remove large pieces of limestone rubble. The potential for a very large area of excavation is also possible, because the extent of the buried quarry system is not fully defined. In addition, the excavation at depth may mobilize additional contaminants through fractures in the limestone thereby spreading contamination over a wider, deeper area. The installation of the passive drainage system and the interceptor trench into bedrock is not unique construction, but may require the blasting of rock. The treatment of groundwater using activated carbon as described in Alternative 5 is a very common technology and meeting of the State NPDES discharge requirements to Stout's Creek should not pose a problem.

Cost

Evaluating the capital cost of each alternative indicates that Alternative 4 would be the most costly alternative compared to Alternative 5 and Alternative 3. Using present worth calculations at a 7% discount rate shows that Alternative 4 would be more expensive to implement compared to Alternative 5. Below is summary of the costs:

Alternative	Capital Cost	Annual Operation & Maintenance Cost	Present Worth Cost 7% Discount Rate
3	\$399,500	\$1,700	\$417,000
4	\$1,320,871	\$1,700	\$1,338,960
5	\$831,900	\$28,000	\$1,189,972

State/Support Agency Acceptance

The State of Indiana, the City of Bloomington, and Monroe County all support the implementation of Alternative 5.

Community Acceptance

Community acceptance is an important part of the remedy selection process and was assessed during the public comment period and associated public participation activities. Community acceptance of the preferred alternative identified in the Proposed Plan for the ROD Amendment was fully evaluated at the conclusion of the public comment period. The public comments are addressed in the attached Responsiveness Summary. The majority of comments from the public support the implementation of Alternative 5, the preferred alternative identified in the Proposed

Plan. A few individuals submitted a large volume of comments not supporting Alternative 5. These few individuals prefer a complete excavation remedy.

PRINCIPAL THREAT WASTES

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site whenever practicable [NCP 300.430(a)(1)(iii)(A)]. Identifying principal threat wastes combines concepts of both hazard and risk. In general, principal threat wastes are those source materials considered to be highly toxic or highly mobile which generally cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Conversely, non-principal threat wastes are those source materials that generally can be reliably contained and that would present only a low risk in the event of exposure.

During the source control phase of the cleanup, PCB oil mixed with diesel fuel was discovered in a buried quarry. This area may be one source of the PCBs being released to the spring system. Sampling data during non-storm periods, as well as storm sampling, however, does not show high concentrations being released from the spring system. In addition, volatile organic compounds (VOCs) have not been detected in recent spring sampling. Contaminated groundwater generally is not considered to be a source material. Even with the a portion of the buried quarries containing PCB oil mixed with diesel fuel, neither the spring sampling during non-storm periods, nor storm sampling, reflect the concentrations that were discovered during the excavation. Alternative 5 captures and treats the release of PCBs from the springs at the Bennett's Dump Site.

SELECTED REMEDY

EPA has selected Alternative 5 (passive quarry drain system with installation of groundwater interceptor trench with carbon treatment) to address the continuing release of PCBs into Stout's Creek from the springs at the Bennett's Dump Site. This alternative was selected over the other alternatives, because it is expected to achieve substantial and long-term risk reduction through the capture and treatment of contaminated groundwater and minimize the PCBs released to Stout's Creek. The problems with excavating within buried quarry pits and the difficulty of preventing spring flow during storm events through the passive quarry drain favors Alternative 5 over both Alternative 3 and Alternative 4.

The selected remedy will meet the RAO's by preventing and capturing/treating springs and groundwater to reduce PCBs from entering into Stout's Creek.

The first phase of the cleanup requires that the water in Wedge Quarry Complex (none of which is PCB-contaminated) is drained into the upstream portion of Stout's Creek. Draining the Wedge Quarry Complex should relieve much of the groundwater recharge through the Site and should reduce the transport of PCBs to the creek. Based upon a pre-design study, Pit A, between Icebox and Wedge Quarries is connected to the Wedge complex by a natural flow connector. Connection to Icebox Quarry will be evaluated. Treatment of the water prior to discharge into

the Wedge Quarry Complex may be required, because PCBs have been periodically detected in Ice Box quarry. A conceptual design is shown in Figure 4. As part of the conceptual design, a trench is excavated into rock between Wedge and Wedge South Quarries. Then a trench is excavated into rock from Wedge South to Stout's Creek upstream of the Site. The trench is excavated so as to maintain the water levels in both quarries below an elevation of 737 feet amsl. This level was shown in a pump-down test to keep Mound Spring dry during non-storm flow conditions. An extension of the passive drain network to Pit A and possibility Icebox Quarry may also be implemented based upon results of a pre-design study.

Once the passive drain system is installed, the springs will be evaluated to determine the parameters for the design of a collection trench and water treatment plant. The conceptual design of the collection trench uses an 800-foot long and 8-foot deep trench into rock along the east side of the Site. Water will be collected in the trench and then sent to an on-site treatment plant for subsequent treatment through carbon adsorption. Flow rates are estimated to be at maximum of 100 gpm but this may change based upon the evaluation of flow after the installation of the passive quarry drain. See Figure 5 for a conceptual approach for the interceptor trench.

The captured water will be treated on-Site and discharged to Stout's Creek. Accordingly, the State of Indiana will provide substantive requirements of the National Pollution Discharge Elimination System (NPDES) water discharge limits. Because this discharge is completed on-site, under the Superfund law the State will only provide substantive requirements and no administrative permitting requirements apply. The State of Indiana has identified 327 IAC 5-2-11.1 as a relevant and appropriate cleanup standard, standards of control, and other substantive requirements, criteria, or limitations in determining PCB discharge criteria for any water treatment plant built at Bennett's. 327 IAC 5-2-11.1 provides an alternate way to determine a cleanup level for PCBs where the WQBEL for PCBs is 0.79 part per trillion and, therefore, is less than the limit of quantitation normally achievable and determined by the Indiana to be appropriate for PCBs. As an alternative and consistent with its regulations, Indiana identified an approved analytical methodology that reliably can disclose PCBs in effluent at concentrations of 0.3 ppb. This higher discharge criteria is based upon an approved laboratory method and is appropriate where the 0.79 ppt is less than the limit of quantitation.

An Operations and Maintenance Plan will be developed for the treatment system. In addition to monitoring the treated water discharge pursuant to the NPDES substantive requirements, a groundwater monitoring plan will be developed. Deed restrictions will be placed on the Site to prevent residential development, to prevent deep excavation in the former quarry pits, and to prevent placement of drinking water wells on the Site.

The cost associated with the implementation of the passive quarry drain and collection trench with treatment by carbon adsorption is presented in Tables 1 and 2.

With the implementation of the passive quarry drain and interceptor trench/carbon adsorption treatment system, PCBs will be captured and treated prior to discharge into Stout's Creek. PCB concentrations in fish will improve over time with the implementation of this remedy. The

expected risk associated with adults and children ingesting fish and through dermal contact with Stout's Creek should be protective of the 1 in 1,000,000 excess cancer risk. The already-completed soil cleanup allows for industrial/commercial development at the Site. Once the influent into the water treatment plant from the collection trench consistently meets 0.3 ppb PCBs during all weather events, EPA will evaluate if the treatment system should remain in place, be modified, or eliminated.

STATUTORY DETERMINATIONS

Under CERCLA Section 121 and the NCP, EPA must select remedies that are protective of human health and the environment, that comply with applicable or relevant and appropriate requirements (unless a statutory waiver is justified), that are cost-effective, and that utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

Protection of Human Health and the Environment

The Selected Remedy, Alternative 5, will protect human health and the environment through the treatment of PCB contaminated water by collecting spring water in a trench and treating the PCBs with carbon adsorption. The implementation of the passive quarry drain will help to control spring flow. The release of PCBs into Stout's Creek will be reduced through the implementation of the Selected Remedy and over time, the risk levels will meet the 1 in 1,000,000 excess cancer risk and a Hazard Index of less than 1. There are no short-term threats associated with the Selected Remedy that cannot be readily controlled and no cross-media impacts are expected from the Selected Remedy.

Compliance with Applicable or relevant and Appropriate Requirements

The Selected Remedy - installing a passive quarry drain and collection trench with carbon adsorption treatment for the spring water - will comply with ARARs. A list of ARARs are presented below:

- 327 IAC 2-1-6 Table 1, Surface Water Quality Standards
- 327 IAC 5-2-8 Conditions Applicable to All Permits
- 327 IAC 5-2-11 Considerations in the calculation and specification of effluent limitations
- 327 IAC 5-2-11.1 Establishment of water quality-based effluent limitations for dischargers not discharging water to within the Great Lakes system
- 327 IAC 5-9-2 Applicability of Best Management Practices

- 327 IAC 5-2-13 Monitoring
- 326 IAC 6-4-2 Fugitive Dust Requirements
- 326 IAC 6-4-4 Fugitive Dust Requirements for Vehicle Traffic
- 329 IAC 4.1-4 Requirements for storage and disposal of wastes containing PCBs
- 329 IAC 3.1 Universal Waste Rule
- 329 IAC 10 Solid Waste Land Disposal Facilities

Cost-Effectiveness

The Selected Remedy is cost-effective and represents a reasonable value for the money spent. In making this determination, the following definition was used. “A remedy shall be cost-effective if its costs are proportional to its overall effectiveness.” (NCP 300.430.(f)(1)(ii)(D)). This was accomplished by evaluating the overall effectiveness of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence this alternative represents a reasonable value for the money to be spent.

The estimated present worth cost of the Selected Remedy is \$1,189,972. Even though the Selected Remedy is the most expensive of the Alternatives, it still is considered cost-effective.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner at the Site. Of those alternatives that are protective of human health and the environment and that comply with ARARs, EPA has determined that the Selected Remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and a bias against off-site treatment and disposal, as well as considering State and community acceptance.

The Selected Remedy treats PCB-contaminated spring water prior to discharge to Stout’s Creek. The Selected Remedy reduces the flow of potentially contaminated groundwater to Stout’s Creek and satisfies the criteria for long-term effectiveness through the collection and treatment of

spring water. The Selected Remedy does not present short-term risks and the technology to implement the remedy is not unusual.

Preference for Treatment as a Principal Element

By treating the contaminated spring water through the implementation of the passive quarry drains to reduce spring flow and collecting and treating the spring water, the Selected Remedy addresses the remaining threats posed by the Site through the use of treatment technologies. By utilizing treatment, the statutory preference for remedies that employ treatment as a principal element is satisfied.

Five-Year Review Requirements

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of remedial action to ensure that the remedy is, or will be, protective of human health and the environment. The first Five-Year Review was completed in August 2002 and next scheduled review is in August 2007.

DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

The Proposed Plan for the Bennett's Dump Site was released for public comment on February 3, 2006. The Proposed Plan identified Alternative 5 as the Preferred Alternative for addressing the continuing release of PCBs from springs into Stout's Creek. EPA reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

TABLES

Table 1 – Detailed Costs Associated with the Implementation of the Passive Quarry Drain

Drain from Wedge Complex to Stout's Creek	
Detailed Design	18,000
Clearing and Grubbing	12,000
Blasting and Excavation	75,000
Quarry Water Control During Installation	5,000
Drain Pipe	10,000
Bedding Material	2,500
Concrete Work	1,000
Pipe Installation and Backfill	15,000
Contingency	20,000
Subtotal for Wedge Drain	158,500
Passive Drain from Icebox to Wedge	
Detailed Design	25,000
Clearing and Grubbing	15,000
Blasting and Excavation	75,000
Quarry Water Control During Installation	5,000
Drain Pipe	35,000
Bedding Material	10,000
Concrete Work	1,000
Pipe Installation and Backfill	30,000
In Pipe Sorbent	5,000
Contingency	40,000
Subtotal for Icebox to Wedge Drain	241,000
Operation and Maintenance	
Monthly Inspections for 30 Years	30,000
Periodic Cleaning Once Per Quarter for 30 Years	6,000
Sorption Media Replacement and Disposal	15,000
Subtotal for Operation and Maintenance	51,000
Total Cost for Passive Quarry Drain in Current Dollars	450,000
Total Cost in Net Present Value (7% Discount Rate)	417,000

Table 2 – Detailed Costs Associated With the Implementation of the Passive Quarry Drain and Interceptor Trench with Carbon Adsorption Treatment

Total Cost for Passive Quarry Drain in Current Dollars	450,000
Total Cost in Net Present Value (7% Discount Rate)	417,000
Interceptor Trench	
Detailed Design	10,000
Site Electrical	5,000
Trench Excavation and Backfilling	35,000
Trench Piping	3,000
Trench Collection Sumps	5,000
Trench Sump Pumps	5,000
Clearing and Grubbing	4,000
Water Control During Trench Installation	5,000
Construction Management	10,000
Excavated Material Disposal	25,000
Discharge Piping From Sumps	8,000
Contingency at 15%	17,250
Subtotal Trench Cost	132,250
Treatment System at 100 gpm Maximum Capacity	
Detailed Design	20,000
Site Electrical	10,000
Building Foundation	15,000
Treatment Building	50,000
Tankage	12,000
Pumps	10,000
Bag Filters	6,000
Carbon Units	30,000
Piping	8,000
Instrumentation	30,000
Construction Oversight	25,000
Mechanical/Electrical Installation	30,000
Site Grading	5,000
System Startup	10,000
Contingency at 15%	39,150
Subtotal Treatment System cost	300,150
Trench and Treatment System Operation and Maintenance for 30 Years	
Yearly Technician Cost	10,000
Yearly Engineer Cost	5,000
Yearly Utilities	5,000
Yearly Replacement Parts	3,000
Carbon Changes Amortized Yearly	2,000
Yearly Sampling	3,000

Subtotal Yearly Operation and Maintenance	28,000
30 Years Operation and Maintenance (Constant Dollars)	840,000
30 Years Operation and Maintenance (Net Present Value at 7% Discount Rate)	339,982
TOTAL COST (CONSENT DOLLARS)	1,722,900
TOTAL COST (NET PRESENT VALUE AT 7% DISCOUNT RATE)	1,189,972